12932

PRODUCTION OF POSITIVE π-MESONS IN HYDROGEN BY 660 Mev PROTONS. A. G. Meshkovskii, Iu. S. Pilgin, Ia. Ia. Shalamov, and V. A. Shebanov. Soviet Phys. JETP 4, 404-8(1957) Apr.

With observation angles of 29° and 46° relative to a proton beam there were obtained energy spectra for the production of charged π mesons in the process $p + p \rightarrow \pi^+$. Differential cross sections were measured for the angles of 29°, 46°, and 65° in the laboratory system. (auth)

56-6-9/56

AUTHOR MESHKOVSKIY, A.S., PLIDIN, Y.[illegible], SHALAMOV, YA.YA., SHEBANOV, V.A.

TITLE Creation of π-Mesons on Zero Isotopic Spin Particles. (Obrazovaniye π-mezonov na yadrakh s izotopicheskim spinom nul' Russian)

PERIODICAL Zhurnal Eksperim. i Teoret.Fiziki,1957,Vol 32,Nr 6,pp 1328-1334 (U.S.S.R.)

ABSTRACT For an angle of observation of 45° the present paper determines the energy spectra and the differential production cross sections of positive and negative pions on deuterium as well as the production cross sections of negative pions on carbon.In addition to the results obtained by Poroshkin and Tyapkin the necessary data for the comparison of experimental results with the relation $\sigma^+ + \sigma^- = 2\sigma^0$ was in this way obtained.Here σ^+, σ^- and σ^0 denote the total or differential cross sections of the production of positive, negative, and neutral mesons respectively.Measurements were carried out on the exterior proton bundle of the synchrocyclotron of the United Institute for Nuclear Research.The measuring method and the apparatus have already been described in some of the author's previous works. Results obtained by measuring the energy spectra of positive and negative mesons which were produced by 660 MeV protons on deuteriums and carbon at an angle of observation of 45°, are shown together in a table.A further table contains the differential cross sections of the production of positive and negative mesons. The he-

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AUTHORS: Meshkovskiy, A.G., Shalamov, Ya. Ya., Shebanov, V.A., 56-3-8/59

TITLE: The Production of Negative π-Mesons by the Bombardment of Various Nuclei with 660 MeV Protons. (Obrazovaniye otritsatel'nykh π-mezonov protonami s energiyey 660 MeV na yadrakh razlichnykh elementov)

PERIODICAL: Zhurnal Eksperim. i Teoret.Fiziki, 1957, Vol. 33, Nr 3, pp.602-605 (USSR)

ABSTRACT: For an angle of observation of 45° with respect to the proton beam of 660 MeV the meson-production cross sections $d\sigma^-/d\Omega$ for the following elements were determined.

Element	$d\sigma^-/d\Omega \cdot 10^{27}$
Li	0,93 ± 0,14
Be	1,00 ± 0,15
C	1,00 ± 0,13
Al	1,64 ± 0,26
Cu	2,82 ± 0,43

For Ag and Pb the π-meson yield was measured only at a meson energy of 157 ± 5 MeV. Herefrom $d\sigma^-/d\Omega$ for Ag can be determined at (2,87 ± 0,88) mb/steradian for Pb with (4,18 ± 1,16) mb/steradian. There are 2 figures and 4 Slavic references.

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The Production of Negative π-Mesons by the Bombardment of Various Nuclei with 660 MeV Protons. 56-3-8/59

SUBMITTED: March 25, 1957

AVAILABLE: Library of Congress.

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SHEBANOV, V. A., Cand Phys-Math Sci -- (diss) "Formation of charged π -mesons by protons with an energy of 660 Mev upon the nuclei of various elements." Mos, 1958. 6 pp (Acad Sci USSR) (KL, 16-58, 116)

SOV-120-58-1-5/43

AUTHORS: Blinov, G.A., Lomanov, M.F., Meshkovskiy, A.G., Shalamov, Ya.Ya. and Shebanov, V.A.

TITLE: A Large Freon Bubble Chamber (Bol'shaya puzyr'kovaya freonovaya kamera)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 1, 2 plates and pp 35-38 (USSR)

ABSTRACT: The working volume of the chamber described in the present paper is 17 litres and it works at room temperature at a pressure of 38 atm. A mixture of freon-12-freon-13, having a density of about 1.2 is used. The maximum path of particles in this chamber is 0.7 of the mean path between nuclear interactions. A diagram of the chamber is shown in Fig.1. The main body of the chamber is made of steel and the windows are covered by plexiglass plates, 9 cm thick and attached to the body of the chamber by steel flanges. A description is given of a device giving good pressure control. The chamber was used in the beam of the synchrocyclotron of the United Institute for Nuclear Studies. The beam employed was either the proton or the neutron beam, the maximum energy being 680 MeV. Fig.3 (facing p.34) shows a photograph of particles scattered from a paraffin target irradiated with 670 MeV protons. The following persons are thanked for their inter-

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SOV-120-58-1-5/43

A Large Freon Bubble Chamber.

est and collaboration: A. I. Alikhanov, V. A. Beketov, Yu. I. Makarov, M. G. Polikarpov, V. A. Shchegolev, V. P. Rumyantseva and Ye. V. Kuznetsov. There are 3 figures, 1 table and 8 references, of which 5 are English and 3 Soviet.

SUBMITTED: July 4, 1957.

1. Bubble chambers--Design 2. Bubble chambers--Materials
3. Methyl halides--Applications 4. Particles--Detection

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SOV/56-34-6-8/51

AUTHORS: Meshkovskiy, A. G., Shalamov, Ya. Ya., Shebanov, V. A.

TITLE: The Energy Spectra and the Angular Distribution of the Positive Pions Produced by 660 MeV Protons on Carbon (Energeticheskiye spektry i uglovoye raspredeleniye π^+-mezonov, obrazovannykh na uglerode protonami s energiyey 660 MeV)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 34, Nr 6, pp 1426-1433 (USSR)

ABSTRACT: This paper investigates the energy spectra and the absolute yields of the positive pions produced by 660 MeV protons on carbon for the angles $19^{\circ}30'$, 29°, 38°, 56°, and 65° in the laboratory system. All the measurements were carried out by means of a pion spectrometer in the exterior proton beam of the synchrocyclotron of the Laboratoriya yadernykh problem Ob"yedinennogo Instituta yadernykh issledovaniy (Laboratory for Nuclear Problems of the United Institute for Nuclear Research). A table shows the results of the measurement of the differential cross sections $d^2\sigma_+/d\Omega\, dE$ for various observation angles and the energy spectra of the positive pions are

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The Energy Spectra and the Angular Distribution of the Positive Pions Produced by 660 MeV Protons on Carbon

demonstrated by some diagrams. An other table gives the cross sections $d\sigma_+/d\Omega$. The next part of this paper discusses the form of the spectra. The average energy of the positive pions in the system connected with the center of inertia practically does not depend on the departure angle and amounts to ~100 MeV. The cross section $d\sigma^*_+/d\Omega^*$

(in the system of the center of inertia) does not depend much on the angle in the interval 36 - 103°. An analogous result was also found for neutral pions (Ref 9). The above mentioned cross section may be estimated also by considerations basing on the principle of the isotopic invariance. The ratio $d\sigma_+/d\sigma_-$ depends only little on the angle and the yield of the negative mesons amounts only to 15 - 20 % of the positive meson yield. The last part of this paper compares the yields of the positive mesons produced on free and bound protons. The decrease (by 2 times) of the probability of the production of positive pions by p-p-collisions in a carbon nucleus with respect to the analogous probability for free p-p-collisions can be explained well by the absorption of protons in the nuclear matter,

The Energy Spectra and the Angular Distribution of the Positive Pions Produced by 660 MeV Protons on Carbon

if the experimentally observed positive pions were produced on the nucleus surface. The authors thank Yu. D. Prokoshkin for the discussion of the results. There are 2 figures, 2 tables, and 15 references, 11 of which are Soviet.

SUBMITTED: January 13, 1958

AUTHORS: Meshkovskiy, A. G., Shalamov, Ya. Ya., Shebanov, V. A. SOV/56-35-1-8/59

TITLE: Energy Spectra and Angular Distribution of π^+-Mesons Produced in p-p Collisions at an Energy of 660 - 760 MeV (Energeticheskiye spektry i uglovoye raspredeleniye π^+-mezonov obrazovannykh v p-p-soudareniyakh pri energiyakh 660-670 MeV)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 1, pp 64 - 70 (USSR)

ABSTRACT: The authors give a report about investigations of p-p collisions at E_p = 670 MeV and compare their results with those obtained in earlier papers (Refs 1-7) by other Soviet authors. Sidorov (Ref 1) investigated p-p collisions at E_p = 660 MeV at 5 angles between 60 and 120°; Meshcheryakov et al. (Ref 2) investigated the π^+ spectrum at 24° by means of magnetic analysis; it was again Meshcheryakov et al. (Ref 3) who reported on the determination of the absolute π^+-yield at 29, 46, and 65° and the spectra at 29 and 46°; Neganov and Savchenko (Ref 4) investigated the energy spectrum of 4 angles between

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108 and 160° as well as the yield between 60 and 160° etc. In the present paper observations are carried out at 19°30', 38° and 56°, and E_{π^+} as well as the differential cross section $d^2\sigma/d\Omega dE$ are measured (results in tables 1 and 2 and in figures 1 and 2, all in c.m.s.). It was found that in the c.m.s. the shape of the π^+-spectrum for the $p+p \rightarrow p+n+\pi^+$ reaction depends on the angle of emission. For the angular distribution the formula

$$d\sigma^*/d\Omega^* = [(0,97 \pm 0,06)+(0,50 \pm 0,21)\cos^2\vartheta^*].10^{-27} cm^2 \text{ steradian}^{-1}$$

is obtained. The numerical results for the ϑ^*-values between 35 and 101° at E_p = 660 MeV are given in table 3. For the total cross section

$\sigma_{pp}^{\pi^+} = (14,4 \pm 1,2).10^{-27} cm^2$ is obtained. Figure 3 shows π^+-spectra at E_p = 660 MeV for 19°30', 29, 38, 46 and 56°, which are compared with the result obtained by Meshcheryakov et al. (Ref 2) for 24°. In conclusion the authors thank V.P.Dzhelepov for the interest he displayed in this paper,

Energy Spectra and Angular Distribution of π^+-Mesons SOV/56-35-1-8/59
Produced in p-p Collisions at an Energy of 660 - 760 MeV

and I.Yu.Kobzarev for having discussed the experimental results. There are 3 figures, 3 tables, and 7 references, all of which are Soviet.

SUBMITTED: February 24, 1958

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24(5)

AUTHORS: Blinov, G. A., Lomanov, M. F., Shalamov, Ya. Ya., Shebanov, V. A., Shchegolev, V. A.

SOV/56-35-4-7/52

TITLE: Investigation of the Interaction of π^+-Mesons With Light Nuclei in the Energy Range 80-300 MeV (Issledovaniye vzaimodeystviy π^+-mezonov s legkimi yadrami v oblasti energiy 80-300 MeV)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 4, pp 880-886 (USSR)

ABSTRACT: The investigations were carried out in a Freon bubble chamber (17 liters, 50.22.15 cm^3) for ten energy values in the range of 80-300 MeV; measurements were carried out, for the interaction between positive pions and C-, F-, and Cl-nuclei, of the charge-exchange scattering cross sections, of star production cross sections, and of total elastic and inelastic scattering cross sections. In the interval of 210-300 MeV the production of charged pions by π^+-mesons was observed in 6 cases. In transition from 80 to 200 MeV the exchange scattering cross section is doubled and attains 10% of the geometric nuclear cross section. The star production cross section has its maximum at about 180 MeV. Also 260 MeV proton interaction was investigated.

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Investigation of the Interaction of π^+-Mesons With Light Nuclei in the Energy Range 80-300 MeV

SOV/56-35-4-7/52

A comparison of stars occurring in exchange scattering with stars occurring in the interaction between protons and C-, F-, and Cl-nuclei shows that exchange scattering in light nuclei occurs as a result of a single interaction of the inciding π^+-meson with the individual nucleon of the nucleus. Comparison of stars occurring in absorption with those produced by protons shows that within the energy interval investigated π^+-absorption is in general the result of a single interaction of the π^+-meson with a proton-neutron pair. In the case of 200 MeV π^+-mesons this process occurs in 60-70% of cases. The experimental order and the carrying out of the experiments is described in detail. Results are shown by diagrams and tables. Figures 2-4 show photographs of charge-exchange scattering processes. Figure 4 shows a typical case of a $\pi^0 + e^+ + e^- + \gamma$ reaction. For π^+-mesons the exchange scattering reactions with free nucleons develop according to the scheme $\pi^+ n \rightarrow \pi^0 p$, and the absorption ($E_{pion} < 100$ MeV) according to $\pi^+ + (pn) \rightarrow (pp)$. For the 6 cases of the generation of charged pions on F-nuclei a cross section

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of $(0.7 \pm 0.3) \cdot 10^{-27} cm^2$ was measured. The authors thank A. A. Tyapkin for discussing the results, V. P. Dzhelepov for making it possible to carry out the experiments, and V. P. Rumyantseva and K. A. Zaytsev for their assistance in evaluating measuring results. There are 7 figures, 3 tables, and 10 references, 5 of which are Soviet.

SUBMITTED: May 6, 1958

24(5)
AUTHORS: Lomanov, M. F., Meshkovskiy, A. G., Shalamov, Ya. Ya., Shebanov, V. A., Grashin, A. F. SOV/56-35-4-8/52

TITLE: Bremsstrahlung of π-Mesons in Interaction With Nuclei (Tormoznoye izlucheniye π-mezonov pri vzaimodeystvii s yadrami)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 4, pp 887-893 (USSR)

ABSTRACT: Already in earlier papers the pion bremsstrahlung in the nuclear field of forces has been investigated theoretically by several authors (Refs 1-4, Landau, Pomeranchuk, Vdovin, Solov'yev). Solov'yev investigated pion bremsstrahlung at energies near the rest-energy of pions, and determined the bremsstrahlung cross section on the nucleon as being of the order of $10^{-28} cm^2$. For the pion bremsstrahlung on nuclear forces larger cross sections are obtained. In the present paper the authors report the discovery of a pion bremsstrahlung during the investigation of the interaction between positive pions and light nuclei in the energy range near rest energy. Experiments were carried out with the external π^+-meson beam of the synchrocyclotron

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of the Laboratoriya yadernykh problem Ob"yedinennogo instituta yadernykh issledovaniy (Laboratory for Nuclear Problems of the United Institute for Nuclear Research). The authors used a bubble chamber with a Freon mixture (CCl_2F_2+$CClF_3$). The γ-quanta of the bremsstrahlung were observed by means of the conversion effect on electron-positron pairs. (In this connection compare also the papers worked out by the authors in cooperation with Blinov and Shchegolev)(Refs 5, 6). Energy- and cross section measurements are here carried out for pion nuclear force bremsstrahlung in the energy range of $80 < E_{\pi^+} < 300$ MeV on C-, F-, Cl-nuclei, and results are compared with theoretical results. For the inelastic pion scattering on nuclei (processes

$$\pi^+ + A \rightarrow \pi^+ + \gamma + A' \text{ and } \pi^+ + A \rightarrow \pi^+ + \pi^0 + A'$$

where A and A' denote the initial- and final states of the nucleus respectively) and the same elastic processes, 20 cases of such a pion bremsstrahlung were found on 7000 plates (elastic + inelastic), and a cross section (on F-nuclei) of $(4.5 \begin{smallmatrix} + 1.2 \\ - 0.2 \end{smallmatrix}) \cdot 10^{-27} cm^2$ was determined. Among these 7000 pictures

Bremsstrahlung of π-Mesons in Interaction With Nuclei SOV/56-35-4-8/52

3 cases of bremsstrahlung caused by π^+-absorption on the nucleus were ascribed to $\pi^- + A \rightarrow \gamma + A'$, $\pi^+ + A \rightarrow \pi_0 + A'$) and in 2 cases the bremsstrahlung is ascribed to charge-exchange scattering of π^+-mesons on the nucleus ($\pi^+ + A \rightarrow \pi^0 + \pi^0 + A$:). Calculation of the cross sections was carried out in quasi-classical approximation, and good agreement with theoretical results was obtained. The authors thank I. Ya. Pomeranchuk for the interest he displayed in this work. There are 3 figures, 1 table, and 8 references, 6 of which are Soviet.

SUBMITTED: May 6, 1958

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21 (7)

AUTHORS: Krestnikov, Yu. S., Meshkovskiy, A. G., Shalamov, Ya. Ya., Shebanov, V. A., Kobzarev, I. Yu. SOV/56-37-3-52/62

TITLE: On the Decays $\mu \to e + \gamma$ and $\mu \to e + \nu + \bar{\nu} + \gamma$

PERIODICAL: Zhurnal eksperimental'noy i tecreticheskoy fiziki, 1959, Vol 37, Nr 3 (9), pp 873-875 (USSR)

ABSTRACT: From the hypothesis of the existence of an intermediate boson of great mass (universal A-V interaction) it follows that the decay $\mu \to e + \gamma$ is possible, which is forbidden according to A-V point interaction. Feynberg calculated the probability of this interaction and showed that the ratio $\varrho_1 = R(\mu \to e + \gamma)/R(\mu \to e + \nu + \bar{\nu})$ depends on the cut-off parameter Λ. If Λ is equal to the boson mass $\varrho_1 \approx 10^{-4}$, if $\Lambda < M$, it may become arbitrarily small. The authors of the present "Letter to the Editor" searched for the $\mu \to e + \gamma$ decays by means of a 17 liter freon bubble chamber. The chamber was located in the external π^+ beam of the synchrocyclotron of the OIYaI (Joint Institute of Nuclear Research). The 200 Mev π^+-mesons were slowed down by means of a graphite filter and were stopped in the chamber space. About 20000 stereophotographs

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were obtained, which were twice evaluated. The evaluation lines are given. Of the three possible decays $\mu \to e + \nu + \bar{\nu} + \gamma$, $\pi \to \mu + \nu + \gamma$, and $\mu \to e + \gamma$ not a single one of the third kind was found among 91000 π-μ-e decays. ρ_1 was determined as amounting to $\leq 4.3 \cdot 10^{-5}$. In the evaluation of the plates reactions of the first kind were found with $(e, \gamma) < 180^0$; such a photo is shown by figure 1. Such a decay has hitherto not been observed. A table shows all cases in which $E_\gamma \gtrsim 15 - 20$ Mev and in which the angle $(e, \gamma) \gtrsim 50 - 60^0$. The table contains data concerning the (e, γ)-angle, E_e and E_γ, as well as the energy of the decay products Q. For processes of the first kind it was found that Q = 105.2 Mev, for those of the second kind - 33.9 Mev. Figure 2 shows investigation results in form of a diagram, where the number of recorded pairs is plotted versus the angle of rotation in the muon stopping point. The ratio of the reactions $\rho_2 = R(\mu \to e + \nu + \bar{\nu} + \gamma)/R(\mu \to e + \nu + \bar{\nu})$ was determined as amounting to $\left(0.80 \begin{smallmatrix} + 0.24 \\ - 0.36 \end{smallmatrix}\right) \cdot 10^{-3}$.

Theoretically, $1.02 \cdot 10^{-3} < \rho_2 < 1.80 \cdot 10^{-3}$ was obtained

(for the A-V interaction). The authors finally thank Academician A. I. Alikhanov for his discussion and interest, M. F. Lomanov, Yu. I. Makarov, and V. I. Smetanina for their assistance, I. S. Bruk for making it possible to carry out computations on the electronic computer of the type M-2 of the Institut elektronnykh i upravlyayushchikh mashin AN SSSR (Institute for Electronic and Control Machines of the AS USSR), and R. A. Ioffe for carrying out these computations. There are 2 figures, 1 table, and 8 references, 1 of which is Soviet.

SUBMITTED: June 9, 1959

S/120/60/000/03/042/055
E032/E514

21.5200

AUTHORS: Shalamov, Ya. Ya. and Shebanov, V. A.

TITLE: The Use of Xenon-Freon and Xenon-Propane Mixtures in Bubble Chambers

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No 3, pp 141-142

ABSTRACT: In their search for working substances having a high Z which can be used at room temperature and are not toxic or corroding, the present authors have carried out experiments designed to determine the characteristics of mixtures of xenon with various other substances used as the working liquid in bubble chambers. It was found that mixtures of xenon with freon-12 (CCl_2F_2) and xenon with propane (C_3H_8) were the most satisfactory. The mixtures were tested in a stainless steel chamber having a working volume of 44 cm^3. The characteristics of the mixtures found experimentally at a working temperature of 25°C are given in the following table.

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The Use of Xenon-Freon and Xenon-Propane Mixtures in Bubble Chambers

Mixture	Percentage Composition of Xe (by weight)	Saturation Vapour Pressure of the Mixture at 25°C	Density at 25°C	Radiation length, cm
1. Xe + CCl_2F_2	37.6	23.6	1.5	9.3
2. Xe+C_3H_8	65.0	24.6	0.96	12.0

The first mixture has a high density and a low radiation length. It is non-corrosive. The second mixture has a high density of the free hydrogen, reaching the liquid hydrogen density. Acknowledgments are made to Ye. V. Kuznetsov for discussions and to Yu.I. Makarov for assistance in this work. There are 1 table and 6 references, 1 of which is Soviet and 5 English.

SUBMITTED: April 10, 1959

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SHEBANOV, V.A.

86893

S/056/60/039/005/009/05
B029/B077

24.6900

AUTHORS: Barmin, V. V., Krestnikov, Yu. S., Pershin, I. I., Rumyantseva, V. P., Shalamov, Ya. Ya., Shebanov, V. A.

TITLE: The Asymmetry in the Decay of Λ^0 Hyperons Produced by Negative Pions With a Momentum of 2.8 Bev/c and Observed in a Freon Bubble Chamber

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 5(11), pp. 1229-1231

TEXT: The distribution of decay products of Λ^0 particles with respect to their production level is described by $W(\xi)\,d\xi \sim (1 + \alpha\bar{P}\xi)d\xi$; the asymmetry coefficient α denotes the degree of non-conservation of parity during the decay of Λ^0 particles; $\bar{P}$ denotes the average polarization of the hyperon over all directions of Λ^0, and the following relation is valid too: $\vec{\xi} = [[\vec{p}_{\pi prim}\ \vec{p}_{\Lambda}]\vec{p}_{\pi decay}]$. $\vec{p}_{\Lambda}$, $\vec{p}_{\pi prim}$, and $\vec{p}_{\pi decay}$ are the unit vectors of the momenta of the Λ^0 particle, the primary and the "decay pions". In general, $\alpha\bar{P}$ is calculated from the formula $\alpha\bar{P} = 2(N_{\uparrow} - N_{\downarrow})/(N_{\uparrow} + N_{\downarrow})$.

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$N_{\uparrow}$ and $N_{\downarrow}$ denote the number of pions leaving the production level in an upward or downward direction. The values of $\alpha\bar{P}$ at energies above 1 Bev permit conclusions about the polarization of Λ^0 hyperons produced at these energies. Therefore, the authors investigated the asymmetry in the decay of Λ^0 hyperons which were produced on light nuclei by negative pions with a momentum of (2.8 ± 0.3) Bev/c in a 17-liter Freon bubble chamber without a magnetic field. The measurements were made with a beam of negative mesons of the proton synchrotron of OIYaI (Joint Institute of Nuclear Research). For negative pions with a momentum of 2.8 Bev/c, Λ^0 particles were produced mainly according to the reaction $\pi^- + N \rightarrow \Lambda^0 + K + n\pi$, and a preliminary estimate yielded $\bar{n} \approx 1.5$. The first examination of about 60,000 stereophotos showed about 1200 "forks" at the end of pion tracks. 183 Λ^0 decays were selected, of which 165 refer to the production of Λ^0 particles by Freon (that is, by nuclei of C,F,Cl). 18 cases refer to production by a propane-xenon mixture, that is, by nuclei of H, C, Xe. The average momentum of the Λ^0 particles used for the measurement was 650 Mev/c in the laboratory system. Results of αP measurement:

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The Asymmetry in the Decay of Λ^0 Hyperons Produced by Negative Pions With a Momentum of 2.8 Bev/c and Observed in a Freon Bubble Chamber

Filling material of the chamber	Total number of Λ^0 decays	Number of negative pions produced by the decay of a Λ^0 hyperon emitted upward	downward	on the producing level	$\alpha \bar{P}$
Freon	165	67	95	3	-0.34 ± 0.16
Xenon-propane	18	9	8	1	$+0.12 \pm 0.47$
Total number of cases	183	76	103	4	-0.30 ± 0.15

The systematic errors are below 20%. The value of $\alpha \bar{P}$ is most likely negative during the decay of hyperons which gives rise to 5-Bev negative pions. This could be caused by the change of sign of the polarization during the transition from 1 Bev to higher energies of the negative pions produced. But the statistical accuracy of this investigation is not adequate for a definite statement. The authors thank A. I. Alikhanov, A. G. Meshkovskiy,

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The Asymmetry in the Decay of Λ^0 Hyperons Produced by Negative Pions With a Momentum of 2.8 Bev/c and Observed in a Freon Bubble Chamber

and I. Yu. Kobzarev for a discussion of the results obtained, V. I. Veksler for making possible the experiments with the proton synchrocyclotron in Dubna, the operators of the synchrocyclotron, and several laboratory assistants of OIYaI. There are 1 table and 8 references: 2 Soviet and 6 US.

SUBMITTED: July 2, 1960

Card 4/4

SHALAMOV, Ya.Ya.; SHEBANOV, V.A.

Using xenon-freon and xenon-propane mixtures for bubble chambers. Prib. i tekh. eksp. no.3:141-142 My-Je '60. (MIRA 14:10)
(Bubble chamber) (Xenon)

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S/056/60/039/005/010/05
B029/B077

24.6900

AUTHORS: Shalamov, Ya. Ya., Shebanov, V. A.

TITLE: Production of π^0 Mesons Due to π^-p Collisions With a π^- Meson Momentum of 2.8 Bev/c

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 5(11), pp. 1232-1236

TEXT: The authors investigated the cross section for the reaction: $\pi^- + p \rightarrow m\pi^0 + n$ ($m = 1,2,3$) for $p_{\pi^-} = 2.8$ Bev/c; for this purpose the outer negative pion beam of the proton synchrotron of OIYaI (Joint Institute of Nuclear Research) was studied with the aid of a 17-l bubble chamber filled with a propane—xenon mixture or a Freon-13—Freon-14 mixture. About 3000 stereo-pictures were made of the π^- beam. Several examinations of the pictures disclosed 125 trackless stars in the propane-xenon mixture and 103 in the Freon mixture. Here is the distribution of the number of events in the gas mixture as a function of the number of electron-positron pairs:

1) Number of $(e^+ + e^-)$ pairs	0	1	2	3	4	5	6
2) Number of events in the propane-xenon mixture	13	30	41	26	9	5	1

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Production of π^0 Mesons Due to π^-p Collisions With a π^- Meson Momentum of 2.8 Bev/c

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3) Number of events in the Freon mixture 13 52 22 11 3 1 -
The probability of finding trackless stars on C,F,Cl (Freon) nuclei, or on H,C,Xe (propane-xenon mixture) nuclei is (0.93±0.1)% or (1.6±0.15)% of the total cross section of inelastic interaction between negative pions and nuclei. By using the above data the cross section per free proton was calculated to be (2.2± 0.3 mb). The angular distribution of γ quanta agreed for both gas mixtures. Therefore, Fig. 2 furnishes also the γ-quantum distribution in a neutral pion decay if this pion has been formed on a free proton. The cross sections for the $\pi^- + p \rightarrow m\pi^0 + n$ reaction with $m = 1,2,3$ are $\sigma_{\pi^0 n} = (0.2\pm0.25)$ mb, $\sigma_{2\pi^0 n} = (1.3\pm0.4)$ mb, $\sigma_{3\pi^0} = (0.7\pm0.4)$mb. The angular distribution of γ quanta is very anisotropic in the center-of-mass system, and can be divided into two parts, one of which is isotropic. For a hard neutral-pion spectrum, the angular distribution of neutral pions agrees well with that of γ quanta. According to V.M. Maksimenko, the $\pi^- + p \rightarrow m\pi^0 + n$ reactions have to total 10.7% of the inelastic scattering cross section involving negative pions and protons. The above values agree well with experimental data yielded by the present study (10.1 + 1.4 %). The anisotropy in the angular distribution of neutral pions

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Production of π^0 Mesons Due to π^-p Collisions With a π^- Meson Momentum of 2.8 Bev/c

S/056/60/039/005/010/051
B029/B077

cannot be explained by the statistical theory. V. S. Barashenkov attempts to explain the asymmetric angular distribution of the mesons produced by assuming that the peripheric collisions amount to $\gtrsim 20\%$ of the total cross section of a π^-p collision. The cross section of exchange scattering may be written as $\sigma(\pi^- + p \rightarrow \pi^0 + n) = (9/2)[f - g]^2$, where the amplitudes f and g correspond to the isotopic states of $T=3/2$ and $T=1/2$. According to L. B. Okun' and I. Ya. Pomeranchuk, the exchange scattering cross section amounts to a small fraction of the total inelastic scattering cross section at high energies; therefore, $f \approx g$. The authors thank Academician A. I. Alikhanov for cooperation, Academician V. I. Veksler for making these experiments possible, Yu. S. Krestnikov, Yu. I. Makarov, N. S. Khropov, N. G. Birger, and V. M. Maksimenko for discussions, I. S. Bruk for statistical computations and for making possible calculations on the electronic computer M-2(M-2) of Institut elektronnykh i upravlyayushchikh mashin Akademii nauk SSSR (Institute of Electronic and Control Machines, Academy of Sciences USSR), and also G. M. Adel'son who made these calculations. Ye. V. Kuznetsov is mentioned. There are 2 figures, 12 tables, and 10 references: 5 Soviet, 4 US, and 1 Dutch.

SUBMITTED: July 2, 1960

Card 3/3

SHEBANOV, V.A., inzh.

Heat cycle during welding and hard facing of sheets with spaced arcs. Svar. proizv. no.6:12-15 Je '61. (MIRA 14:6)

1. Khersonskiy sudoremontnyy zavod.
(Electric welding)
(Thermometry)

SHEBANOV, V.A. (g.Kherson)

Processes of heat treatment and certain characteristics of the hard facing of small cylindrical parts. Avtom. svar. 14 no.5: 30-36 My '61. (MIRA 14:5)
(Hard facing) (Machinery---Maintenance and repair)

SHALAMOV, Ya.Ya.; SHEBANOV, V.A.; GRASHIN, A.F.

Generation of Y^0 (Λ, Σ^0)-hyperons and K^0-mesons on light nuclei by π^--mesons having a pulse energy of 2.8 Bev/c. Zhur. eksp. i teor. fiz. 40 no.5:1302-1312 My '61. (MIRA 14:7)

1. Institut teoreticheskoy i eksperimental'noy fiziki AN SSSR.
(Hyperons) (Mesons)

S/137/62/000/002/121/144
A052/A101

AUTHOR: Shebanov, V. A.

TITLE: Physico-mechanical properties of built-up metal in CO_2 medium

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 2, 1962, 11, abstract 2E51 ("Zap. Leningr. s.-kh. in-ta, v. 85, 1961, 68-73)

TEXT: To study the combined work of the base metal and the metal built-up on the surface of a part in CO_2 medium, comparative tests for fatigue, a_k and wear of Ст 45 (St 45) samples were carried out. The samples were normalized prior to building-up. The building-up was carried out on direct current of reversed polarity from the СУГ-2б (SUG-2b) welding generator with СВ-08Г2СА (Sv-08G2SA) and СВ-10ГС (Sv-10GS) wires 1.6 and 2 mm in diameter. The fatigue test was carried out on a cantilever machine with 3,000 rpm. The decrease of σ_w of the samples built-up with Sv-08G2SA wire in CO_2 medium did not exceed 6 4% compared with the St 45 reference samples. The impact test was carried out to find the effect of building-up on the tendency of metal to pass into the brittle state. The test results have shown that the mean a_k value of the samples built-up with Sv-08G2SA and Sv-10GS wire is higher than a_k of St 45 reference

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SHEBANOV, V.A., inzh.

Repairing ship parts by built-up welding in a carbon dioxide atmosphere. Sudostroenie 27 no.9:53-55 S '61. (MIRA 14:11)
(Ships--Maintenance and repair)

SHEBANOV, V.A., inzh.

Selecting surfacing conditions. Sudostroenie 27 no.11:54-56 N '61. (MIRA 15:1)
(Ships--Welding)

BAYUKOV, Yu.D.; LEKSIN, G.A.; SUCHKOV, D.A.; SHALAMOV, Ya.Ya.; SHEBANOV, V.A.

Backward elastic scattering of 2.8 bev/c π^--mesons on neutrons. Zhur.eksp.i teor.fiz. 41 no.1:52-55 Jl '61. (MIRA 14:7)

1. Institut teoreticheskoy i eksperimental'noy fiziki AN SSSR.
(Mesons--Scattering) (Neutrons)

Sheffanov, V.A.

PAPIAN, V. V.; [illegible]; KUZNETSOV, Ye. V.; [illegible]; NIKITIN, Yu. P.; SHEBANOV, V. A.

"π^0-Production in the Coulomb Field of Nucleus"

report presented at the 11th Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Institute of Theoretical and Experimental Physics, Moscow, USSR

SHEBANOV, V.A.

[illegible], V.V., [illegible], Yu. S., [illegible], Yu. V., [illegible], A. G., and
SHEBANOV, V. A.

"Search for Resonances in the Reaction of $K\bar{K}$ Pair Production"

report presented at the Intl. Conference on High Energy Physics, Geneva,
4-11 July 1962

Inst. of Theoretical and Experimental Physics, Moscow, USSR

S/056/62/043/004/016/061
B102/B180

AUTHORS: Barashin, V. V., Krestnikov, Yu. S., Kuznetsov, Ye. V., Meshkovskiy, A. G., Nikitin, Yu. P., Shebanov, V. A.

TITLE: π^0 meson production in the nuclear Coulomb field

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 4(10), 1962, 1223 - 1230 .

TEXT: To study the mechanism of coherent interaction, in which momentum transfer is very low and nuclear excitation absent, $\pi^- + N^A_Z \Rightarrow \pi^- + \pi^0 + N^A_Z$ reactions were examined. They can only occur via interaction with the nuclear Coulomb field, diffractive pion "dissociations" being strongly forbidden. Only one pion dissociation experiment is hitherto known (Baldassarre et al. Nuovo Cim. 21, 459, 1961). Using a 2-liter xenon bubble chamber and 2.8 Bev/c π^- mesons from the proton-synchrotron of the OIYaI about 10,000 stereophotographs were obtained, and a similar number with a freon chamber. 48 and 31 events of π^- scattering through 3-30° accompanied by two electron-positron pairs were found respectively. After kinematic ana-

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π^0 meson production ...

lysis, there remained 35 and 13 events which could be attributed to the $\pi^- + Xe \to \pi^- + \pi^0 + Xe$ reaction. This is $(3.7\pm1.3)\cdot10^{-3}$ of the total number of inelastic interactions, the cross section of which was 1200 mb, from which the pion dissociation cross section was found to be $\sigma_c = 4.4\pm1.6$ mb. Recording efficiency was taken into account. There was a sharp peak at $\vartheta < 10^\circ$ in the angular distribution of this reaction. For σ_{ph} the mean cross section of the photoprocess $\gamma + \pi^- \to \pi^- + \pi^0$, 0.6 ± 0.2 mb was obtained using the relation $\sigma_c = 7.5\ \bar{\sigma}_{ph}$. It holds for the energy range $4m^2 \ll w^2 \ll 16m^2$, where m is the pion mass and w the center-of-mass total energy of the pions produced in the photoprocess. There are 3 figures and 1 table.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki Akademii nauk SSSR (Institute of Theoretical and Experimental Physics of the Academy of Sciences USSR)

SUBMITTED: May 17, 1962

Card 2/2

S/056/62/043/004/061/061
B104/B186

AUTHORS: Barmin, V. V., Krestnikov, Yu. S., Kuznetsov, Ye. V., Meshkovskiy, A. G., Shebanov, V. A.

TITLE: Search for resonances of K^oK^o pair production reactions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 4(10), 1962, 1564-1565

TEXT: K^oK^o pair production processes with 2.8 Bev/c π^--mesons in Freon and xenon bubble chambers had been studied by Ye. V. Kuznetsov and I. Ye. Timoshin (PTE, 4, 40, 1959) and G. A. Blinov et al. (PTE, 1, 35, 1956). In these studies 38 and 13 events respectively of K^oK^o pair production were observed. To find possible resonances in the K^oK^o system the distribution of the pairs detected over their effective masses was now constructed (Fig. a). The error in the masses is approximately ± 25 Mev. The broken lines indicate the boundary values of the $m(K^oK^o)$. The distribution has a peak at $m(K^oK^o) = 1275$ Mev but the statistical reliability of this is very low. It was shown that the hypothesis of the decay of a σ_o-meson according to the scheme $\sigma_o \longrightarrow K^o + K^o + \pi^o$ could be completely

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refuted. A total of nine events was detected in which two K^o-mesons departed without any charged particle or quantum. These events can be interpreted according to the reaction $\pi^- + p \rightarrow K^o + \bar{K}^o + n$. In this case the effective mass of $\bar{K}^o + n$ can be determined from the momentum and angle of departure of the K^o-meson (Fig. b). The peak at 1715 Mev has little statistical reliability so the resonances can only be supposed. There is 1 figure.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki
(Institute of Theoretical and Experimental Physics)

SUBMITTED: July 17, 1962

Card 2/2

SHEBANOV V A.

S/056/63/044/002/052/065
B184/B102

AUTHORS: Barmin, V. V., Krestnikov, Yu. S., Kuznetsov, Ye. V., Meshkovskiy, A. G., Nikitin, Yu. P., Shebanov, V. A.

TITLE: New data on π^0 meson production in the nuclear Coulomb field

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 2, 1963, 748 - 749

TEXT: The present article is a continuation of experimental studies (ZhETF, 43, 1223, 1962) on the reaction $\pi^- + Xe \longrightarrow \pi^- + \pi^0 + Xe$, observed in a xenon bubble chamber bombarded by pions of 2.8 Bev/c. 25 events had been found on scanning about 10,000 stereophotographs. Now another 15,000 stereophotographs were scanned four times and 53 π^0 production events were found. Since $d\sigma/d\Omega = f(\theta)$ tends to zero with $\theta \longrightarrow 30^\circ$, the reaction cross-section was determined from the values obtained for $3^\circ \leq \theta \leq 30^\circ$, and $\sigma_c = 2.65 \pm 0.90$ mb was obtained; θ is the angle of π^- emission. The inelastic scattering cross-section was taken as 1200 mb. From this result also the cross-section $\bar{\sigma}_p$ of the reaction $\gamma + \pi^- \longrightarrow \pi^- + \pi^0$ was estimated; assuming $\sigma_c/\bar{\sigma}_p = 7.5$, a value of 0.35 ± 0.12 mb was obtained for $\bar{\sigma}_p$. There are

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S/056/63/044/002/052/065
B184/B102

New data on π^0 meson production...

1 figure and 1 table.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki Akademii nauk SSSR (Institute of Theoretical and Experimental Physics of the Academy of Sciences USSR)

SUBMITTED: November 2, 1962

Card 2/2

ACCESSION NR: AP4009109 S/0056/63/045/006/1879/1890

AUTHORS: Barmin, V. V.; Dolgolenko, A. G.; Krestnikov, Yu. S.; Meshkovskiy, A. G.; Nikitin, Yu. P.; Shebanov, V. A.

TITLE: Observation of the decay

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 45, no. 6, 1963, 1879-1890

TOPIC TAGS: Omega meson decay, Omega meson charge parity, radiative decay, Omega meson width, Omega neutral particle decay, pion proton interaction, negative pion proton interaction

ABSTRACT: The reaction $\pi^- + p \to n + \omega \to n + \pi^0 + \gamma$ was investigated for negative-pion momenta of 1.25, 1.55, and 2.8 BeV/c in a 17-liter propane-xenon bubble chamber. The purpose of the investigation was to detect the decay $\omega \to \pi^0 + \gamma \to 3\gamma$, the existence of which was established on the basis of the excess of number of events

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ACCESSION NR: AP4009109

with three γ-rays as compared with the number of background events from the reactions $\pi^- + p \rightarrow n + m\pi^0$ ($m \geq 2$), and was further confirmed by a statistical method based on the kinematics of the $\omega \rightarrow \pi^0 + \gamma$ decay. The cross sections for the reaction under study were estimated in the indicated momentum interval. "In conclusion, we express our deep gratitude to A. I. Alikhanov for constant interest and valuable advice. We thank the ITEF (Institute of Theoretical and Experimental Physics) proton synchrotron crew who enabled us to obtain the large number of photographs in a short time. We thank I. Ya. Pomeranchuk, L. B. Okun', I. Yu. Kobzarev, B. L. Ioffe, Yu. A. Simonov, and A. S. Zhizhin for fruitful theoretical discussions. We are very indebted to A. S. Kronrod, R. S. Guter, and Ye. M. Landis for valuable advice and for organizing and carrying out the calculations on the ITEF electronic computer. We thank the scanning staff under the direction of V. P. Rumyantseva for scanning the pictures, Yu. I. Makarov, N. S. Khropov, and B. I. Chistyakov for operating the bubble chamber, Yu. V. Trebukhov-

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ACCESSION NR: AP4009109

skiy for aid in the work and V. V. Vladimirskiy for helpful discussion of the results. Orig. art. has: 8 figures, 27 formulas, and 2 tables.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki (Institute of Theoretical and Experimental Physics)

SUBMITTED: 03Jul63 DATE ACQ: 02Feb64 ENCL: 00

SUB CODE: PH NO REF SOV: 003 OTHER: 010

Card 3/3

ACCESSION NR: AP4009142 S/0056/63/045/006/2082/2084

AUTHORS: Barmin, V. V.; Dolgolenko, A. G.; Krestnikov, Yu. S.; Meshkovskiy, A. G.; Shebanov, V. A.

TITLE: Search for the $\omega \rightarrow e^+ + e^-$ decay

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 45, no. 6, 1963, 2082-2084

TOPIC TAGS: Omega meson, Omega meson decay, negative pion proton interaction, bubble chamber, proton synchrotron, three pion decay

ABSTRACT: An attempt is made to observe the decay $\omega \rightarrow e^+ + e^-$ experimentally by the authors earlier (ZhETF v. 45, 1878, 1963) in a 17-liter xenon-propane bubble chamber exposed to 1.55 and 2.8 BeV/c negative pion beams from the proton synchrotron at the Institut teoreticheskoy i eksperimental'noy fiziki (Institute of Theoretical and Experimental Physics). The chamber was operated without a mag-

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ACCESSION NR: AP4009142

netic field, with 20,000 pictures at 1.55 BeV/c and 40,000 pictures at 2.8 BeV/c scanned independently. Four two-prong stars were found to satisfy completely all the selection criteria, along with three doubtful cases. Reasons are advanced for assuming that all seven two-prong stars are cases of the reaction $\pi^- + p \rightarrow n + \omega$ with the subsequent $\omega \rightarrow e^+ + e^-$ decay of the ω meson. The sources of background reactions are analyzed. The value obtained for the ratio of the probability of this decay to the three-pion decay is found to be $(0.40^{+0.15}_{-0.30}) \times 10^{-2}$, which agrees well with the theoretical predictions. "We are deeply grateful to A. I. Alikhanov for his constant interest in the work and for valuable advice, to the scanning department of the Institute of Theoretical and Experimental Physics for scanning the photographs, to Ya. S. Yelenskiy for an experimental determination of the scanning efficiency for electrons in a chamber, and to I. Yu. Kobzarev and Yu. P. Nikitin for discussions. Orig. art. has: 2 figures and 2 formulas.

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ACCESSION NR: AP4009142

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki (Institute of Theoretical and Experimental Physics)

SUBMITTED: 09Oct63	DATE ACQ: 02Feb64	ENCL: 00
SUB CODE: PH	NO REF SOV: 002	OTHER: 004

Card 3/3

ACCESSION NR: AP4012534 S/0056/64/046/001/0142/0147

AUTHORS: Barmin, V. V.; Dolgolenko, A. G.; Krestnikov, Yu. S.; Meshkovskiy, A. G.; Shebanov, V. A.

TITLE: An investigation of the charge exchange $\pi^- + p \rightarrow n + \pi^0$ and $\pi^- + p \rightarrow n + \eta$ $(\eta \rightarrow 2\gamma)$ reaction in the 1.55--4.5 BeV/c region

SOURCE: Zhurnal eksper. i teoret. fiz., v. 46, no. 1, 1964, 142-147

TOPIC TAGS: pion proton interaction, negative pion proton interaction, pion proton charge exchange, Eta meson production, neutral pion angular distribution, pion angular distribution, backward scattering, backward charge exchange, backward exchange scattering

ABSTRACT: The reactions were investigated with a 17-liter propane-xenon bubble chamber with an aim at checking on the theoretical prediction by L. B. Okun' and I. Ya. Pomeranchuk (ZhETF, v. 30, 424, 1956) that a considerable decrease takes place in the exchange scat-

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ACCESSION NR: AP4012534

tering with increasing π^- meson energy. The number of pictures scanned were 20,000, 60,000 and 20,000 at momenta 1.55, 2.8, and 4.5 BeV/c. The charge exchange reaction cross sections were found to be 3.0, 1.54 $\pm$ 0.37, 0.36 $\pm$ 0.09, and 0.19 $\pm$ 0.12 mb for 1.14, 1.55, 2.80, and 4.50 BeV/c. The η-meson production cross sections for the same momenta are 0.5, 0.32 $\pm$ 0.22, 0.08 $\pm$ 0.07, and 0.05 $\pm$ 0.07, respectively. From these values, and from the angular distribution of the π^0 meson in the charge-exchange reaction, it was found that the differential cross section for backward exchange scattering is 0.04 $\pm$ $\pm$ 0.02 mb/sr for 1.5 BeV/c and 0.008 $\pm$ 0.005 mb/sr for 2.8 BeV/c. "In conclusion we are deeply grateful to A. I. Alikhanov for continuous interest and for valuable advice, and to I. Ya. Pomeranchuk and V. V. Vladimirskiy for a discussion of the results. We are grateful to the ITEF proton synchrotron crew for providing a large number of photographs within a short time. We are very indebted to L. M. Voronina, V. N. Dez, and N. A. Ivanova for carrying out the computations with the ITEF electronic computer. Orig. art. has: 3

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APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R001548930006-5"

ACCESSION NR: AP4012534

figures, 4 formulas and 3 tables.

ASSOCIATION: Institut teoreticheskoy i eksperimental'noy fiziki (Institute of Theoretical and Experimental Physics)

SUBMITTED: 30Jul63	DATE ACQ: 26Feb64	ENCL: 00
SUB CODE: PH	NO REF SOV: 006	OTHER: 004

Card 3/3

L 01319-67 EWT(1)

ACC NR: AT6031149 SOURCE CODE: UR/3138/65/000/401/0005/0016 28 27 BH

AUTHOR: Barmin, V. V.; Dolgolenko, A. G.; Meshkovskiy, A. G.; Shebanov, V. A.

ORG: none

TITLE: Analysis of exchange scattering with momentum $\pi^- + p \rightarrow \pi^0 + n$ at 2.8 Bev/c

SOURCE: USSR. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii. Institut teoreticheskoy i eksperimental'noy fiziki. Doklady, no. 401, 1965. Issledovaniye obmennogo reaseyaniya otritsatel'nogo piona s protonom v rezul'tate kotorogo poluchayetsya neytral'niy pion i neytron pri impul'se 2,8 Gev/c, 5-16

TOPIC TAGS: exchange scattering, pi meson, proton, pion, pion proton interaction

ABSTRACT: An analysis is made of the $\pi^- + p \rightarrow \pi^0 + n$ reaction at $P_{\pi^-} = 2.8$ Bev/c. The total cross section for this reaction is $\sigma = 0.35 \pm 0.04$ mb. The angular distribution $d\sigma/d\Omega$ has two maxima: one close to 0° and the other within the interval $0.3 < \cos\theta < 0.45$. This corresponds to the square of the transmitted momentum $t \simeq -1.4$ (Bev/c)^2. The values of $d\sigma/d\Omega$ at 0° and 180° are

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L 07959-67 EWT(m)

ACC NR: AT6031325 SOURCE CODE: UR/3138/66/000/423/0001/0016

35
32
B+1

AUTHOR: Yelenskiy, Ya. S.; Shebanov, V. A.

ORG: none

TITLE: Remarks on the investigation of PI-RHO interactions in heavy liquid bubble chambers 14

SOURCE: USSR. Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii. Institut teoreticheskoy i eksperimental'noy fiziki. Doklady, no. 423, 1966. Ob izuchenii vzaimodeystviy negativnogo piona s protonom v puzyr'kovoy kamere a tyazheloy zhidkost'yu, 1-16

TOPIC TAGS: hydrogen, proton, electron, PI meson, propane bubble chamber, spark chamber, freon xenon, heavy liquid

ABSTRACT: The correlations between reactions on free hydrogen (n_1) and on bound protons without traces of nuclear fission (n_2) were determined during the study of interactions of π^--mesons with 2.8 Gev/c in a propane-xenon bubble chamber. The difference method was used to determine the proportion of nuclear events $\alpha_{b.c.} = n_2/n_1+n_2$ of various reactions. Aside from 3000 pictures in

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a propane-xenon bubble chamber, some 3000 photographs were analyzed for this purpose in a freon bubble chamber, and 3000 more in a xenon bubble chamber. If the kinematic selection criterion of hydrogen reactions is not used, the nuclear background $\alpha_{g.c.}$ is 37 to 62%, depending on the type of reaction. The $\alpha_{s.c.}$ magnitudes were also evaluated on the basis of data obtained in the bubble chamber, in view of possible experiments with spark chambers, the electrodes of which contain free hydrogen. It is shown that in the case of thin electrode plates less than 0.2 g/cm^2, the $\alpha_{s.c.}$ is close to the $\alpha_{g.c.}$. In conclusion, the authors express their gratitude to G. A. Leksin, A. G. Meshkovskiy, and V. P. Kanavets, for discussion of the results. Orig. art. has: 5 tables and 1 formula.

SUB CODE: 20, 13, 14, 09/ SUBM DATE: 16Feb66/ ORIG REF: 009/
OTH REF: 005/

SHEBANOV, V.A.; VORONOV, K.D.

Conditions for preparing coal pulp for flotation. Koks i khim, no.1:18-21 '62. (MIRA 15:2)

1.Khar'kovskiy gornyy institut (for Shebanov). 2. Chumakovskaya TSentral'naya ugleobogatitel'naya fabrika (for Voronov).
(Coal--Flotation)

3(7) SOV/2113

PHASE I BOOK EXPLOITATION

Tsentral'nyy institut prognozov

Vopросy morskikh gidrometeorologicheskikh prognozov (Problems of Marine Hydrometeorological Forecasting) Moscow, Gidrometeoizdat (Otd-niye), 1958. 88 p. Errata slip inserted. (Series: Its: Trudy, vyp. 76) 1,000 copies printed.

Sponsoring Agency: USSR. Glavnoye upravleniye gidrometeorologicheskoy sluzhby.

Ed. (Title page): N.A. Belinskiy; Ed. (Inside book): N.N. Goryunskiy Tech. Ed.: I.M. Zarkh.

PURPOSE: This issue of the Institute's Transactions is intended for hydrometeorologists and advanced students in the field.

COVERAGE: This collection of articles deals with the problem of forecasting the onset of seasonal ice phenomena. Individual papers treat conditions in the Japanese, Bering, White, and Caspian Seas, the Dvina, Pechora, and Dnepr Rivers. No personalities are mentioned. References accompany each article.

TABLE OF CONTENTS:

SHEBANOV, V. T.

SHEBANOV, V. T. - "Kinematic Investigation and Designing of Type Mechanisms of Charging Devices of Automatic Machines." Min Higher Education USSR, Moscow Order of Lenin Aviation Inst imeni Sergo Ordzhonikidze, Moscow, 1955 (Dissertation for the Degree of Candidate in Technical Sciences)

SO: Knizhnaya Letopis', No. 33, 1955, pp 85-87

25 (1) SOV/145-58-7/8-5/24

AUTHOR: Shebanov, V.T., Candidate of Technical Sciences

TITLE: Designing Crank-Connecting Rod and Crank-Rocking Arm Mechanism on the Basis of the Coefficient of Stroke Speed Change

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy - Mashinostroyeniye, 1958, Nr 7-8, pp 36-47 (USSR)

ABSTRACT: As a basis for his analysis of the problem, the author takes the coefficient $K = \frac{t_{pr}}{t_{obr}}$, where t_{pr} is the the time required for the driven element to make a forward stroke, and t_{obr} is the time during which the reverse stroke is performed. In mechanisms having a single value of the coefficient K and a single value of the slide stroke S, the crank rotation axles A are disposed on a circumference having a radius R_i. The interrelation between the values R_i and S is expressed by the formula

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Designing Crank-Connecting Rod and Crank-Rocking Arm Mechanism on the Basis of the Coefficient of Stroke Speed Change

$R_i = \frac{S}{2\sin\theta_i}$ where θ_i is the overlap angle. The stroke speed change coefficient K is determined by the function $K = \frac{180 + \theta_i}{180 - \theta_i}$ (Fig 1). Position of the axles A on the circumference is determined by the angle φ formed by the straight line coming from the point C" and intersecting the circumference at the point A. The interdependence between the angles φ and θ_i is determined by the function $\varphi = \text{arctg} \frac{\cos\theta_i - \frac{1}{3}}{\sin\theta_i}$. Taking concrete values for the angle φ: 30°; 45°; 60°; 75°; 79°10'; 85°30'; 90°, the author computes the corresponding values of the coefficient K: 1.63; 1.42; 1.25; 1.12; 1.08; 1.04; 1. By giving a number of graphs and

Card 2/4

Designing Crank-Connection Rod and Crank-Rocking Arm Mechanism on the Basis of the Coefficient of Stroke Speed Change

diagrams, the author establishes the interrelations between the parameters of crank-connecting rod and crank-rocking arm mechanisms. Thus, in Fig 2, a graph showing the changes of minimum value of transfer angle, connecting rod length, crank length, as well as the ratio of crank length to the connecting rod length, is given. Fig 3 illustrates a layout of forming rocking arm mechanisms on the basis of crank-connecting rod mechanisms. The changes of transfer angle minimum value, when the coefficient K is assumed equal to 1, are given in Fig 4. In Figs 5, 6 and 7, changes are given when K is assumed equal to respectively 1.12, 1.25 and 1.42. There are 5 graphs, 2 figures and 2 references, 1 of which is Soviet and 1 German.

ASSOCIATION: Moskovskiy aviatsionnyy institut (Moscow Aviation Institute)

SOV/145-58-7/8-5/24

Designing Crank-Connection Rod and Crank-Rocking Arm Mechanism on the Basis of the Coefficient of Stroke Speed Change

SUBMITTED: June 25, 1958

Card 4/4

S/145/60/000/003/002/010
D221/D301

AUTHOR: Shchanov, V.T., Candidate of Technical Sciences

TITLE: Designing toggle mechanisms with a specified pressure angle for the driving slide

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Mashinostroyeniye, no. 3, 1960, 14 - 25

TEXT: The object is to determine limit values for small angles of the toggle mechanism, where jamming may occur. The problems considered are resolved by elementary geometrical methods, as applied to axial and off-center mechanisms. It is assumed that the stroke S of slide; distance $I_{A'C_K}$ from A' to C_K (Fig. 1a) or I_{AC_K} (Fig. 1b); eccentricity e, and the permitted angle of pressure, are known. These allow the radius R_H to be determined, as well as the minimum length of rocker, r_{min}. Similarly, the equation is given for determining the length of the conrod L. This is followed by analysis of

mechanisms with minimum distance between the fulcrum of the rocker and the nearest extreme position of the slide. The lowest value of the above is when the conrod is in a vertical position with the slide displaced by S. There is no jamming if the angles of pressure are $\gamma_K > \gamma_D$ and $\gamma_n > \gamma_D$. The minimum radii are determined by a set of equations, together with L and the above distance. Finally, mechanisms with equal pressure angles in the extreme positions of the slide are considered. The equation demonstrate that increase of pressure angle γ_D from a certain initial value results in units with $\gamma_n = \gamma_K > \gamma_D$. The pressure angle is related to the design parameters; however, if the former is fixed, then only one mechanism with minimum length of rocker will correspond to it. The length conrod for mechanisms with $\gamma_n = \gamma_K = \gamma_{max}$ are equal to the lengths of the rocker. Changes of the pressure angle up to γ_{max} will produce two types of mechanisms: In one category r_i will vary from r_{min} to $r_{\gamma_{max}}$, whereas in the other - from $r_{\gamma_{max}}$ to r_{γ_D}. In the latter

Designing toggle mechanisms ...

type, the length of the rocker r_i, may reach a value, when rotation of crank changes its sign with slide travelling in the same sense. The author quotes equations for limit magnitudes of length of rocker, r_{lim}, pressure angle γ_D, and length of conrod, L_{lim}, for the off-center units. By specifying the above values it is possible to establish the elimination of changes in the direction of rotation with a constant sense of slide travel. The goemetrical locus is given of fulcrums for $l_{A'C_k} = 2.0$ S, e = 0.33 S, $\gamma_D = 30^o$. When the first three parameters are specified, it is possible to determine the pressure angles which preclude excessive values. This is demonstrated in a diagram, where two regions are obtained for the off-center and one for the axial mechanisms. This is followed by three numerical examples. The above allows the following conclusions to be made: The toggle mechanisms, having few components, are widely used. The development of methods for their design will expand their application. The deduced equations will allow the development of units of small size. There are 6 figures and 2 Soviet-bloc references.

Card 3/4

S/145/60/000/003/002/010
D221/D301

Designing toggle mechanisms ...

ASSOCIATION: Moskovskiy aviatsionnyy institut (Moscow Aviation Institute)

SUBMITTED: July 6, 1959

Fig. 1. Off-center and axial mechanisms.

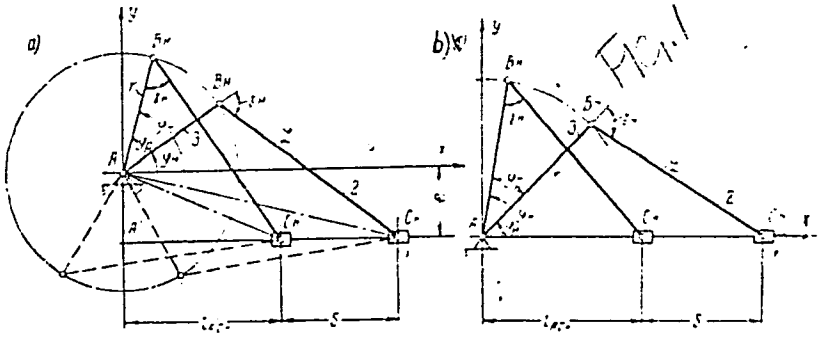

Рис. 1. Дезаксиальный и аксиальный механизмы

Card 4/4

cribed. A numerical example is given. There are 5 figures and 3 Soviet-bloc references.

ASSOCIATION: Moskovskiy aviatsionnyy institut (Moscow Aviation Institute)

SUBMITTED: July 6, 1959

SHEBANOV, V.T., kand.tekhn.nauk

Designing two-beam four-bar linkages according to a given transmission angle. Izv.vys.ucheb.zav.; mashinostr. no.8:37-55 '62. (MIRA 15:12)

(Links and link motion)

137-58-5-11102

Translation from Referativnyy zhurnal. Metallurgiya. 1958 Nr 5 p 314 (USSR)

AUTHORS. Nechayeva, Ye.A., Shebanova L.V.

TITLE. Determination of Iron in Iron Ores and Sinters (Opredeleniye zheleza v zheleznykh rudakh i aglomeratakh)

PERIODICAL. Tr. Nauchno-tekhn. o-va chernoy metallurgii. Ukr. resp. pravl., 1956. Vol 4, pp 160-162. Comments pp 163-168

ABSTRACT. When Usatenko's method for determination of Fe was studied at the laboratory of the plant im. Petrovskiy it was found that the end of titration is not distinct. Thus, the results of titration of the same sample may fluctuate within a range of 0.6%. This method therefore, is not superior to the bichromate method. When determining the Fe by titrating with a solution of Ti^{3+} 0.1 g of Fe ore is dissolved in 15 cc of HCl (specific gravity 1.19). After the solution is diluted with water to a volume of 120-150 cc and is allowed to cool. 2 cc of 10% solution of NH_4SCN are added to it and the resulting solution is titrated with a solution of titanous oxide sulfate until the indicator loses its color.

V.N.

Card 1/1 1. Iron--Determination

Condensation of pinacol dihalides with allyl chloride in presence of magnesium. A. D. Petrov and M. P. Shebanova. *J. Gen. Chem. U.S.S.R.* 25, 1927-31(1956) (Engl. translation).—See *C.A.* 50, 8450*f*. B. M. R.

Shebanova, M. P.

6

Condensation of pinacol dihalides with allyl chloride in the presence of magnesium. A. D. Petrov and M. P. Shebanova (D. I. Mendeleev Chem. Technol. Inst., Moscow). *Zhur. Obshchei Khim.* 25, 1082–8(1955).—A mixt. of 100 g. $(EtMeCCl)_2$ and 152 g. CH_2:$CHCH_2Cl$ was added dropwise to 48 g. Mg (for technique cf. *C.A.* 47, 3218d), with cooling after the reaction had started; after treatment with aq. NH_4Cl and distn. of the product from Na, there was obtained a mixt. of 2 products, resolved into 10% $(CH_2$:$CHCH_2CMeEt)_2$, b_{760} 210–15°, n_D^{25} 1.4620, d_{20} 0.818, which hydrogenated over Raney Ni at 190° and 200 atm. H to the corresponding satd. compound, b. 216–18°, f.p. below −80°, n_D^{20} 1.4440, d_{20} 0.798. The condensation also gave 38% C_{11} hydrocarbon, b_{760} 178–80°, n_D^{25} 1.4560, d_{20} 0.802, which with 1% $KMnO_4$ gave a ketone, identified as MeCOEt, and $AcCHMeCH_2CO_2H$, identified as the Ag salt; thus the 2nd product is probably CH_2:$CHCH_2CHMeCMe_2$:CMeEt, formed through allylic rearrangement of the starting material. $(Me_2CBr)_2$, decomp. 168–9°, prepd. from the glycol and dry HBr, was condensed similarly with 200% excess CH_2:$CHCH_2Cl$ with Mg in Et_2O at −20°, yielding a mixt. of $(CH_2$:$CHCH_2CMe_2)_2$ and $[Me_2C(OEt)]_2$, b. 145–7°, which after hydrogenation over Raney Ni gave a 12:88 mixt. of a hydrocarbon $C_{12}H_{26}$ and the above diether, which could not be sepd.

G. M. Kosolapoff

SHEBARSHIN, M.N. (Kemerovskaya oblast')

Calculating the area of a trapezoid and a rosette. Mat. v shkole no.5:63-64 S-O '59. (MIRA 13:2)
(Geometry, Plane)

SHEBARSHINA, N.N.

Transportation factor in the distribution of petroleum refining enterprises. Nefteper. i neftekhim. no.1:30-33 '63.
(MIRA 16:10)

1. Institut kompleksnykh transportnykh problem Gosudarstvennogo ekonomicheskogo soveta pri Sovete Ministrov SSSR po tekushchemy planirovaniyu narodnogo khozyaystva.

Determination of cadmium in alloys by the absorption of neutrons. A. P. Ratner, G. R. Fel'k, and A. A. Shebashev. *Primenenie Mechenykh Atomov v Anal. Khim., Akad. Nauk S.S.S.R., Inst. Geokhim. i Analit. Khim.* 1955, 70–4.—The method is based on the effective neutron absorption cross section which is the difference in neutron absorption exhibited by nuclei of various elements on the charge and the energy of the neutrons. The thermal neutron absorption cross section for Cd ($\sigma.10^{-24}$ sq. cm.) is 2507. As source of neutrons a prepn. of RaTh + Be was used. The neutrons were slowed down to thermal velocities in transformer oil, then passed through Cd or an alloy contg. it (target) and a 0.4 mm. thick Cd filter, and were then recorded in a slow-neutron indicator. The transmission (P) was calcd. from $P = N - N_\infty/N_0 - N_\infty$ where N is the flux intensity passing through the given filter, N_∞ is the intensity passing through the target, and N_0 intensity without filters.

M. Hoseh

SHEBEKO,A.F.

New state grape farms on the Terek River. Vin.SSSR 15 no.3: 26-27 '55. (MIRA 8:8)

1. Glavnoye upravleniye vinodel'cheskoy promyshlennosti (RSFSR)
(Terek Valley--Viticulture)

SHEBEKO, V. L.

Diphtheria therapy. Klin. med., Moskva 28:8, Aug. 50. P. 86

1. Of the Infectious Diseases Division of Isfara Hospital, Isfara, Leninabad Oblast, Tadzhik SSR.

CIML 19, 5, Nov., 1950

SHEBANOVA, Anna Ivanovna; MALEIN, Nikolay Sergeyevich; MULUKAYEV, R.S., red.; FLAKSERMAN, N.A., tekhn.red.

[Soviet legislation on industrial hygiene; materials for a lecture] Sovetskoe zakonodatel'stvo ob okhrane truda rabochikh i sluzhashchikh; material k lektsii. Moskva, Ob-vo po rasprostraneniiu polit. i nauchnykh znanii RSFSR, 1959. 38 p. (MIRA 13:4)
(Industrial hygiene--Law and legislation)
(Industrial safety--Law and legislation)

USSR/Chemistry - Hydrocarbon Synthesis, Fuels — 1 Jun 52

"The Mechanism of Hydrocarbon Synthesis From Carbon Monoxide and Hydrogen Over Iron Catalysts," I. B. Rapoport, M. M. Levkovich, All-Union Sci Res Inst of Synthetic Liquid Fuels and Gases

"Dok Ak Nauk SSSR" Vol 84, No 4, pp 72?-727

Carbon monoxide and hydrogen react to form CH_2 and water. The water then reacts with CO to form CO_2 and H_2. Expts were made using calcium carbide to take up the water as it is formed. It was found

232T8

that during the 1st hr, while the calcium carbide was still fresh, there was no formation of CO_2. By using water-absorbing substances the course of the hydrocarbon synthesis can thus be controlled. Presented by Acad N. D. Zelinskiy 25 Mar 52.

232T8

Shebanova, M. P.

Tertiary mono- and difluoroalkanes in organomagnesium synthesis. A. D. Petrov, V. L. Sushchinskii, and M. P. Shebanova. *Bull. Acad. Sci. U.S.S.R. Div. Chem. Sci.* 1956, 803-9 (Engl. translation).—See *C.A.* 50, 16857f.
B. M. R.

USSR/Organic Chemistry - Synthetic Organic Chemistry, E-2

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 963

Author: Petrov, A. D., Sushchinskiy, V. L., and Shebanova, M. P.

Institution: Academy of Sciences USSR

Title: Tertiary Mono- and Difluoroalkyls in Grignard-Type Syntheses

Original Periodical: Izv. AN SSSR, 1956, No 4, 510-512

Abstract: The condensation of tertiary mono- and difluoroalkyls with $CH_2 = CHCH_2Cl$ (I), $CH_2 = CH_2CH_2Cl$, and $CH_2 = C(CH_3)CH_2Cl$ in the presence of Mg has been investigated. It is shown that the yields are 2.5 to 3 times higher than with the corresponding chloroalkyls. The starting $(CH_3)CC(CH_3)_2F$ (II), $(CH_3)_2CHCH_2C(CH_3)_2F$ (III), $(CH_3)_3CC(C_3H_7)(CH_3)F$, and $[(CH_3CH_2C(CH_3)F]_2$ are produced in copper apparatus (reactor and condenser); the reactor is packed with dry ice and acetone; anhydrous HF is charged at -40° and dropwise addition of the olefin is started (mixing temperature is not over -30°). The excess HF is removed by passing a stream of N_2 through the reaction

Card 1/2

SHEBANOVA, M. P.

chem

Syntheses of 2,2,3,5,6,8,9,9-octamethyl-3,7-decadiene-3,-5,6,6-tetramethyl-2-carboxy-4-heptenoic acid, and 3,5,6,6-tetramethyl-4-heptenoic acid. A. D. Petrov, V. N. Gramenitskaya, and M. P. Shebanova (D. I. Mendeleev Chem. Technol. Inst., Moscow). *Zhur. Obshchei Khim.* 26, 3324–8 (1956); cf. *C.A.* 48, 3239*d*.—Reaction of 92 g. Mg, 201 g. pinacolone, and 230 g. CH_2:$CHCH_2Cl$ in Et_2O gave 84% *2,2,3-trimethyl-4-hexen-3-ol*, b_{744} 168–70°, n_D^{20} 1.4600, d_{20} 0.8553, which with HCl gave 71.5% *2,2,3-trimethyl-3-chloro-4-hexene*, b_4 45–6°, n_D^{20} 1.4570, d_{20} 0.9043, which (120 g.) in Et_2O added over 4 hrs. to 24 g. Mg in 400 ml. Et_2O at reflux, and after stirring 8 days at room temp. gave after hydrolysis 20.4% *2,2,3,5,6,8,9,9-octamethyl-3,7-decadiene*, b_4 115–20°, d_{20} 0.8401, n_D^{20} 1.4630, f.p. −9 to −10°; oxidation with $KMnO_4$ gave pinacolone, AcOH, HCO_2H, and dimethylsuccinic acid. The Na salt of $CH_2(CO_2Et)_2$ from 194 g. ester and EtONa was treated with 191.3 g. 2,2,3-trimethyl-3-chloro-4-hexene and heated in ampuls 45 hrs. at 100–8° yielding among other products, *di-Et 3,5,6,6-tetramethyl-2-carboxy-4-heptenoate*, b_3 130–5°, n_D^{20} 1.4553, d_{20} 0.9513, in 72.38-g. yield. This (42.1 g.) was hydrolyzed by refluxing 11.5 hrs. with aq. KOH yielding *3,5,6,6-tetramethyl-2-carboxy-4-heptenoic acid*, m. 135° (from H_2O); its di-Ag salt was prepd. and analyzed. Decarboxylation of the acid at 150° at 12 mm. gave 96.3% *3,5,6,6-tetramethyl-4-heptenoic acid*, b_{12} 108–9°, n_D^{20} 1.4521, d_{20} 0.9089; its *Ag salt* was prepd. and analyzed. Oxidation with $KMnO_4$ gave pinacolone.

G. M. Kosolapoff

SOKOLOVA, Ye.B.; SHEBANOVA, M.P.

Synthesis of some cyclohexane homologues of the composition C_{15}-C_{19} having an elevated volume heat of combustion. Izv.vys.ucheb.zav.; khim.i khim.tekh. 3 no.6:1040-1044 '60. (MIRA 14:4)

1. Moskovskiy khimiko-tekhnologicheskiy institut imeni D.I.Mendeleyeva, kafedra tekhnologii neftekhimicheskogo sinteza.
(Cyclohexane) (Heat of combustion)

S/079/60/030/06/09/009
B002/B016

5.3700

AUTHORS: Sokolova, Ye. B., Shebanova, M. P., Zhichkina, V. A.

TITLE: Investigation of the Possibility of Substituting Higher Boiling Solvents for Diethyl Ether in the Ferrocene Preparation From Cyclopentadienyl-magnesium-bromide and Ferrous Chloride

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 6, pp. 2040-2042

TEXT: The industrial manufacture of ferrocene according to the method mentioned in the title has so far not been possible when using diethyl ether as solvent, owing to its ready volatility. In this study, the attempt was made to substitute higher boiling solvents for the ether and to use ferrous chloride instead of the ferric chloride formerly added to the reaction mixture. Two experimental series were made: 1) freshly prepared cyclopentadienyl-magnesium-bromide + $FeCl_3$ which is reduced during the reaction to $FeCl_2$, in the solvents diethyl ether, di-n.butyl ether, diisoamyl ether, anisol, phenetol, triethylamine and dioxane. A higher yield

Card 1/3

Investigation of the Possibility of Substituting Higher Boiling Solvents for Diethyl Ether in the Ferrocene Preparation From Cyclopentadienyl-magnesium-bromide and Ferrous Chloride

S/079/60/030/06/09/009
B002/B016

(61.3 and 45.7%) could only be obtained when using di-n.butyl ether and diisoamyl ether. No yield could be obtained with anisol and phenetol. If, however, dioxane was added in the latter cases in the 2nd reaction stage, a ferrocene yield of 38 and 40%, respectively, was obtained. 2) Cyclopentadienyl-magnesium-bromide + $FeCl_2$ which had been reduced from $FeCl_3$ prior to the reaction by means of chlorobenzene. In addition to the afore-mentioned solvents also tetrahydrofuran was used. It was shown that, when using diethyl ether or tetrahydrofuran in the first reaction stage, and adding $FeCl_2$ in the second without solvent, a yield of 71.2% may be obtained. Anisol (1st stage), dioxane (2nd stage) gave a yield of 36.6% ferrocene. It was thus generally confirmed that the diethyl ether may be replaced by some other ethers and that by direct use of powdered $FeCl_2$ in the solvents mentioned a higher yield may be obtained than that hitherto obtained by Kealy and Pauson (Ref. 1). In connection with the ferrocene reaction A. N. Nesmeyanov and E. G. Perevalova are mentioned.

Card 2/3

Investigation of the Possibility of Substituting Higher Boiling Solvents for Diethyl Ether in the Ferrocene Preparation From Cyclopentadienyl-magnesium-bromide and Ferrous Chloride

S/079/60/030/06/09/009
B002/B016

There are 3 tables and 3 references: 1 Soviet, 1 American, and 1 British.

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskiy institut imeni D. I. Mendeleyeva (Moscow Institute of Chemical Technology imeni D. I. Mendeleyev)

SUBMITTED: June 26, 1959

Card 3/3

S/153/60/003/005/007/016
B013/B058

AUTHORS: Shebanova, M.P., Guseva, N.A.

TITLE: Condensation of 2,2,4 -Trimethyl-4-chloropentane With Organomagnesium Compounds

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1960, Vol. 3, No. 5, pp. 881-884

TEXT: Three paraffin hydrocarbons containing two tertiary carbon atoms were prepared in this study: 2,2,4,4,6-pentamethyl heptane, 2,2,4,4-tetramethyl octane, and 2,2,4,4-tetramethyl decane. The synthesis was conducted by the Grignard - Würtz reaction by means of condensation of 2,2,4-trimethyl-4-chloropentane and isobutenyl chloride with n-butyl bromide or n-hexyl bromide. To prevent the transformation of isobutenyl chloride into diisobutylene, condensation was carried out at 8° - 10°C by the method of V.P. Yavorskiy. In the distillation of the reaction products in vacuo, 15.5% of a fraction with the melting point at 99.5° - 102°C (45mm Hg) was separated. Its properties corresponded to 2,4,4,6,6-pentamethyl heptene-1.

Condensation of 2,2,4-Trimethyl-4-chloro-pentane With Organomagnesium Compounds

S/153/60/003/005/007/016
B013/B058

The position of the double bond on the extreme carbon atom was proved by oxidation of the fraction mentioned with 2% potassium permanganate solution. Formic acid was separated as a consequence of oxidation. Hydrogenation of the fraction mentioned on a nickel catalyst produced 2,4,4,6,6-pentamethyl heptane. The 2,2,4-trimethyl-4-chloropentane was condensed with normal butyl bromide at 19°C only in the presence of 7-8% mercuric chloride, a maximum of 10% 2,2,4,4-tetramethyl octane being formed. Only 7% 2,2,4,4-tetramethyl decane was formed with n-hexyl bromide under equal conditions. The following was stated in conclusion: 2,2,4-trimethyl-4-chloropentane, which easily cleaves the hydrogen chloride, is little active in the synthesis of hydrocarbons with two tertiary carbon atoms. The use of halogen alkyl with a double bond in β-position to the halogen (isobutenyl chloride) increases the yield of hydrocarbons with tertiary carbon atoms. The yield of the condensate produced by the Grignard - Würtz reaction decreases with an extension of the normal radical of the halogen alkyl used. There are 10 references: 6 Soviet.

Card 2/3

Condensation of 2,2,4-Tetramethyl-4-chloro-pentane With Organomagnesium Compounds

S/153/60/003/005/007/016
B013/B058

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskiy institut im. D.I. Mendeleyeva. Kafedra tekhnologii neftekhimicheskogo sinteza (Moscow Institute of Chemical Technology imeni D.I. Mendeleyev. Department of Technology of Petrochemical Synthesis)

SUBMITTED: January 30, 1959

Card 3/3

88921

S/153/60/003/006/003/009
B103/B206

11.1210

AUTHORS: Sokolova, Ye. B., Shebanova, M. P.

TITLE: Synthesis of some homologs of cyclohexane with a composition C_{15} - C_{19} with raised "volume" heat of combustion

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, v. 3, no. 6, 1960, 1040-1044

TEXT: The authors report on the synthesis of monoalkyl-substituted cyclohexane homologs of the type C_{15}— C_{19} with branched alkyl chain and on the determination of their physical and chemical properties, among them of the "weight" and "volume" heat of combustion of artificial mixtures of some synthetized naphthene- and isoparaffin hydrocarbons. The effect of mixing on the heat-of-combustion value was to be clarified by the latter experiment. Table 1 contains the physical properties of: I. 2-methyl-4-ethyl-4-cyclohexyl hexane, II. 2,2,5-trimethyl-3-cyclohexyl hexane, III. 2,2,4,6-tetramethyl-4-cyclohexyl heptane, IV. 2-methyl-5-propyl-5-cyclohexyl octane,

Card 1/6

Synthesis of some homologs of...

V. 5-butyl-5-cyclohexyl nonane, VI. 2,6-dimethyl-4-isobutyl-4-cyclohexyl heptane, VII. 4,9-dipropyl dodecane, and VIII. 5,10-dibutyl tetradecane. The properties and heat of combustion of the mixtures are given in Table 2: A = III, Б = VII, В = VIII. The density and heat of combustion of the synthetized naphthene hydrocarbons are higher by about 3% than the corresponding values of their analogs with a normally built-up aliphatic chain. The authors conclude from Table 2 that the heat of combustion of the above mixtures follows the rule of additivity. T. A. Zhuravleva and L. P.Abramova participated in the experimental part. It follows therefrom that the cyclanes were prepared from suitable, alkylated bezene homologs by hydrogenation on Raney nickel (Ref. 7). There are 2 figures, 2 tables, and 8 references: 6 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskiy institut im. D. I. Mendeleyeva; Kafedra tekhnologii neftekhimicheskogo sinteza (Moscow Institute of Chemical Technology imeni D.I.Mendeleyev; Department of the Technology of Petrochemical Synthesis)

SUBMITTED: January 30, 1959

SOKOLOVA, Ye.B.; SHEBANOVA, M.P.; MRNKOVA, A.P.

Synthesis of the allyl-type bromide, $C_7H_{13}Br$, and its condensation by the Grignard-Wurtz reaction. Zhur.ob.khim. 30 no.7:2161-2164 Jl '60. (MIRA 13:7)

1. Moskovskiy khimiko-tekhnologicheskiy institut imeni D.I. Mendeleyeva.
(Butene) (Hydrocarbons) (Condensation products)

SOKOLOVA, Ye.B.; SHEBANOVA, M.F.; SHCHEPINOV, S.A.

Organolithium synthesis and study of the properties of some α-alkylnaphthalenes of the composition C_{18} - C_{20}. Izv.vys.ucheb.-zav.;khim.i khim.tekh. 4 no.4:617-620 '61. (MIRA 15:1)

1. Moskovskiy khimiko-tekhnologicheskiy institut imeni Mendeleyeva, kafedra tekhnologii neftekhimicheskogo sinteza.
(Lithium organic compounds) (Naphthalene)

28446

S/153/61/004/004/011/013
E141/E135

11.0132

AUTHORS: Sokolova, Ye.B., Shebanova, M.P., and Ishkina, V.I.

TITLE: Alkylation of toluene with crude isooctene

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, vol.4, no.4, 1961, 657-660

TEXT: The authors attempted to synthesize the n-dialkyl-substituted $C_{15}H_{30}$ cyclohexane, a possible component of hydrocarbon fuels. Toluene and isooctene were used as starting materials. 2,4,4-trimethylpentene-1 and 2,4,4-trimethylpentene-2, the isomeric forms of the isobutylene dimer (Ref.1: A.D. Petrov. Khimiya motornogo topliva (Chemistry of motor fuel) Izd. AN SSSR, 1953, p.101) were obtained from crude isooctene by threefold distillation. Crude isooctene contains a considerable fraction (5 weight %) which boils at a temperature up to 101 °C; this fraction was distilled on a 1100 mm high column. The fraction boiling between 99 and 102 °C (constituting about 7 weight %) was also used as alkylating agent. The alkylation reaction was carried out according to the Friedel-Crafts reaction, in the presence of $AlCl_3$, under reaction conditions as described by Sanford

Card 1/2

Alkylation of toluene with crude S/153/61/004/004/011/013
E141/E135

(Ref.3: R.A. Sanford, S.M. Kovach, B.S. Friedman. J. Amer. Chem. Soc., Vol.75, 6327 (1953)). The principal reaction product was the fraction boiling at 109 to 110 °C (75%), its physical properties correspond to the properties of 2,2,4-trimethyl-4-(n-tolyl)-pentane which was previously described (Ref.3). The alkylation product was hydrogenated at a temperature of 180-190 °C for 15 hrs in an autoclave over a nickel catalyst and 2,2,4-trimethyl-4-(4'-methylcyclohexyl)-pentane prepared; this compound has not been described previously in literature.
There are 3 tables and 4 references; 2 Soviet-bloc and 2 English.
The English language references read as follows:
Ref.3: as in the text above.
Ref.4: D. Nightingale, J.R. Janes. J. Amer. Chem. Soc., Vol.66, 159 (1944).

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AUTHORS: Sokolova, Ye. B., Shebanova, M. P., and Nikolayeva, L. F.

TITLE: A New Variant of the Amino Method in Ferrocene Synthesis

PERIODICAL: Zhurnal obshchey khimii, 1961, Vol. 31, No. 1, pp. 332 - 333

TEXT: The "amino method" suggested by G. Wilkinson (Refs. 1, 2) by which ferrocene ($C_5H_5FeC_5H_5$) is obtained in the condensation of cyclopentadiene with $FeCl_2$ in the presence of organic bases is distinguished by its simplicity and the high yield (84 - 88 %) of the end product. $FeCl_2$ is to be obtained in its active form by reduction of $FeCl_3$ with powdery, finely ground metallic iron in tetrahydrofuran or dimethyl ether of ethylene glycol (Ref. 3). By observing all instructions given by G. Wilkinson for this amino method, the authors obtained ferrocene in a yield of 61 %, and not of 84 - 88 %; they apparently proceeded from initial products whose degree of purity was different. The highest ferrocene yield (65 %) was obtained by using butyl acetate instead of tetrahydrofuran. To simplify

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the synthesis of ferrocene, the data of the US patent 2719074 (Ref. 4) concerning the $FeCl_2$ production were used. This method rests upon heating of $FeCl_3$ with chloro benzene at 140°C; the resultant $FeCl_2$ was found to be highly active in the condensation with cyclopentadiene in the presence of diethylamine. For a convenient comparison of the experimental results, all experiments were carried out with equal quantities of the reactants (Table). The ferrocene yield was calculated for iron. As may be seen from the table, satisfactory results were obtained in the experiments of series A (reduction of $FeCl_3$ by Fe), when using di-n-butyl ether, anisole, phenetole, ethyl butyrate, and butyl acetate as solvents. $FeCl_3$ is not reduced to $FeCl_2$ by metallic iron in pyridine, anhydrous alcohol, and acetone. If acetone is replaced by methyl isobutyl ketone, the ferrocene yield is 27 %. If in the above condensation triethylamine, pyridine, and sodium ethylate are used instead of diethylamine, the ferrocene yield suddenly drops. There are 1 table and 4 references: 1 Soviet and 3 US.

Card 2/3

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Card 3/3

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AUTHORS: Sokolova, Ye. B., Shebancva, M.P., and Sheludyakov, V.D.

TITLE: Synthesis of di(methylindenyl)iron

PERIODICAL: Zhurnal obshchey khimii, v. 31, no. 10, 1961, 3379-3381

TEXT: The purpose of the present work was to synthesize di(methylindenyl)iron and study its properties. Three methods of preparing the compound were used. 1) Reacting 1-methylindenylmagnesium bromide with ferrous chloride. 2) Reacting 1-methylindenyllithium with ferrous chloride. 3) Reacting 1-methyl-indene with ferrous chloride in the presence of diethylamine. In the first method, 1-methylindene was added to a magnesium ethyl bromide solution in di-n-butyl ether until the color of the mixture changed to brown when $FeCl_2$ was added in portions. After refluxing for 5 hrs. at 110-120°C the mixture was distilled and the residue

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